take fʒss and ℈j, and mix with the syrup. The whole should measure fʒijss, and each fʒj contain the equivalent of grs. ij of iodine.

Or it may be prepared by dissolving the hydriodate and tartaric acid, each, in syrup instead of water, mixing them together, and letting it stand for a few hours to allow the bitartrate to settle, and pouring off sufficient for the required quantity of syrup. With this latter mode, which appears the more feasible of the two, a slight decomposition takes place with the syrup in the first instance, probably owing to the quantity of sugar being insufficient to preserve it; but, after being mixed with the larger portion of syrup, it remains unchanged.

Syrup of hydriodic acid, by the first method, I have had prepared since the 3d of June, and it remains nearly colourless. I have also syrups having some colour, which have been made for several months, that have the same appearance as when first prepared. In a syrup prepared early in the winter, the sugar has crystallized out of the solution, and the liquor on the surface, now weak of sugar, has a bright-yellow colour, and gives a strong reaction with starch; but the crystallized portion is not affected by it unless a little nitric acid is also added, when it reacts strongly. Hydriodic acid being gaseous, it will not be possible to procure it in a solid form, combined with sugar. When a strong solution is mixed with powdered sugar and moderately heated, it gives off bubbles of hydriodic acid, becoming darker in colour, reacting strongly with starch, and ultimately becoming completely black, with abundance of free iodine.

The precise action of sugar, with reference to those compounds that have been named, is still obscure. Klauer considers that a regular compound is formed in the case of carbonate of iron, but the subject of this notice is an instance where the action of sugar is not confined to salts of iron. In conclusion, it is very probable that the protective agency of sugar is exercised over many other decomposable substances that have not been examined as to this property; and, if it be so, it must become of corresponding importance as a chemical agent in pharmacy.—*Pharmaceutical Journal.*

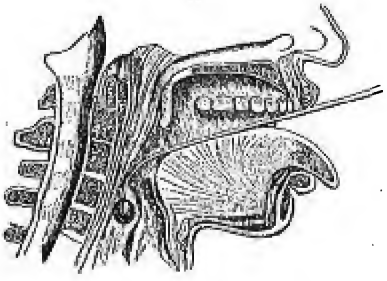
MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

10. *On Topical Medication of the Larynx.* By JOHN ERICHSEN, Esq., Professor of Surgery at University College, and Surgeon to the Hospital.—The practice of treating chronic disease of the larynx by the local application of a strong solution of the nitrate of silver is by no means of very recent origin. Many years ago it was employed in this country by Sir C. Bell; and Dr. Watson, in his *Lectures*, speaks of the practice as having been extensively had recourse to by Mr. Vance, who, being a naval surgeon, applied to it the very expressive term of "swabbing." So far back as 1818, M. Trousseau states that "his preceptor," M. Bretonneau, used the saturated solution of the nitrate of silver as a local application in diseases of the larynx, applying it by means of a sponge attached to a piece of whalebone. Of late years this practice has become a very favourite mode of treatment in many diseases of the throat, and in not a few of the lungs, and has been brought very prominently before the profession, chiefly through the writings of Trousseau, in Paris, and of Dr. Horace Green, in New York.

Of the great value of the local application of a strong solution of the nitrate of silver to the throat, in many affections of the larynx, there can be no doubt. Indeed, I believe it to be impossible to bring deeply seated and very chronic inflammatory or ulcerative affections of this part of the air-passages to an equally satisfactory termination by any other means, or, indeed, to cure the majority of them without this "topical medication;" and the profession is undoubtedly under a debt of gratitude to those practitioners whose names I have mentioned, through whose example and writings the utility of this method of treatment has been demonstrated.

During the last few years, an attempt has been made to treat diseases of the respiratory organs seated *below the larynx* by this method; and, by passing a sponge-tipped probang *between and beyond the vocal cords*, to apply a solution of the nitrate of silver, and various other medicaments, to the interior of the trachea, the bronchi, and even into tuberculous cavities of the lungs. In my recent work, *The Science and Art of Surgery*, whilst discussing this subject, I ventured to express my doubts whether this practice, though commonly spoken of and professedly employed, had ever in reality been carried out; and I proceeded to state that I had no hesitation in expressing my conviction that the sponge probang had never in the living subject been passed *beyond the true vocal cords*, though I believed that with the requisite dexterity it might be got between the lips of the glottis, and the solution freely applied to those parts; and I proceeded to say that, in my opinion, in those cases in which the sponge has been supposed to have been passed beyond and between the true vocal cords, and in which the operator speaks of having felt the constriction exercised by them in its entry and exit, it had not entered the larynx at all, but had passed behind this tube into the œsophagus, the feeling of constriction being produced by its passage beyond the thyroid and cricoid cartilages where they project backwards, and that the caustic solution had been applied, not to the interior of the larynx, except when a few drops accidentally squeezed out by the pressure of the sponge against the lips of the glottis have been inhaled, but to those extensive folds and planes of mucous membrane which invest the base of the epiglottis and the back of the thyroid cartilage, and which, with their subjacent cellular tissue, are usually greatly congested and infiltrated in chronic throat diseases; in fact, that the sponge probang is passed in the way represented in the annexed wood-cut.

Fig. 1.



Indeed, were it otherwise, and did the sponge really penetrate between and beyond the true vocal cords into the trachea, hitching against these, as it was withdrawn, with a jerk, or a distinct feeling of constriction, this operation would be one of the most dangerous in surgery, the whole safety of the patient depending, not on the dexterity of the surgeon, but upon the integrity of the thread, corroded by nitrate of silver, with which the sponge is attached to the whalebone: did that give way, the sponge, hitching against the vocal cords, must necessarily be detached; and what would the condition of that patient be into the chink of whose larynx half a cubic inch of sponge was impacted, or in whose trachea such a mass, saturated with nitrate of silver, lay loose?

This opinion, to which I still adhere, was deliberately formed and based on experiments on living animals, and on the dead subject, on observations made in cases of cut throat, and on a fair share of practical experience in the treatment of the diseases of the air-passages, not only in ordinary hospital and private practice, but when acting as surgeon to the City of London Hospital for Diseases of the Chest. It has, however, met with much opposition and angry denial; and, for venturing it, I have been assailed in terms which a recent re-

viewer somewhat blandly designates as "barely civil." This, however, matters little; truth is but poorly advocated by personal attacks, and medical science has never yet been promoted by sneers. My object in this inquiry (which was commenced twelve years ago, and has been continued at intervals since) has not been to contest the opinions of individual practitioners, but to investigate the broad question as to the possibility of passing the *sponge probang*, in the living subject, through and below the true vocal cords into the trachea and bronchi. To this point I alone refer, and, in doing so, I wish it to be distinctly understood that I do not in any way impugn the great value of the topical application of a solution of the nitrate of silver to the throat in laryngeal diseases, to which I have already borne ample testimony, and of which I have had abundance of experience. The only question at issue is as to the depth to which the *sponge probang* has been passed, and not as to the advantage attending the application of nitrate of silver in throat diseases.

This question has during the past year attracted much attention in America, more particularly in connection with a suggestion made by Dr. H. Green, of treating phthisis by injecting a strong solution of nitrate of silver into the tuberculous cavities, through a tube passed into the lungs through the larynx, trachea, and bronchi. In a paper presented to the New York Academy of Medicine, on this subject, and of which Dr. Green has had the kindness to send me a copy, that gentleman, after alluding in very flattering terms to my published opinions on this subject, proceeds at some length to combat them. The New York Academy of Medicine appointed a committee to gather evidence on this point, and to report thereon; and, through the kindness of Dr. Stone, of New York, a copy of that report, which is of an extremely valuable and interesting character, and to which I shall have occasion presently to refer, has been presented to me. This report confirms the opinion that I had previously expressed, that there was no evidence of the sponge probang ever having been passed through or below the vocal cords; Dr. Green, notwithstanding the special dexterity which he had acquired in the management of this instrument, having in every instance failed to do so.

On inquiring into the evidence on which it is founded, the doctrine of the passage of the sponge probang through and beyond the vocal cords, I have failed to discover that any of a positive character exists, and, so far as I can gather from the writings of its supporters, it would appear that the reasons from which it is inferred to do so may be arranged under the following heads:—

1. The sensations of the patient.
2. The sensations of the surgeon.
3. The analogy offered by the introduction of tubes for the purposes of artificial respiration, and by the inhalation of foreign bodies.

These different conditions we must examine somewhat in detail.

1. *The Sensations of the Patient.*—The exquisite degree of sensibility possessed by the larynx need not be dwelt upon here. Mr. Porter, in his admirable work *On the Surgical Pathology of the Larynx and Trachea*, very justly says: "It (the larynx) is placed as an outwork to protect the important organ of respiration, and rejects vehemently and with spasmodic violence every substance that can by possibility prove offensive or injurious." Many years ago, Magendie showed that this was the most sensitive part of the respiratory tube; and in the year 1843 I published in the *Medical Gazette* a series of experiments which demonstrated the same fact. Since then I have had repeated opportunities of verifying the correctness of these observations in the human subject, in cases of cut throat and aerial fistula, in which, by means of probes introduced through the artificial opening, I have tested the extreme sensibility of the larynx as compared with other parts of the air-passages, and have often observed the spasmodic irritation and great distress suffered by the patient when its mucous membrane is touched from within, and this even though the part is no longer subservient to the purposes of respiration, and the sensation of asphyxia not experienced, which would otherwise be induced, and which would greatly aggravate the distress.

If a long, bent probe, or a gum-elastic catheter, be passed over the back of the tongue, two classes of sensations will be elicited, according to the part that

is touched. If the instrument be directed down the pharynx, and altogether behind the larynx, into the œsophagus, as in the introduction of the stomach-pump tube, the patient will experience some little distress, which is easily quieted. The face will become slightly congested, and the eyes perhaps somewhat suffused, with a disposition to cough, a slight feeling of choking, and some constriction about the chest. All these sensations, however, are transitory. These symptoms may be termed *pharyngeal*.

If, on the other hand, the probe or tube be bent *forwards*, so as to touch the lips of the glottis, and more particularly if an attempt be made to push it on into the larynx, then a widely different train of symptoms will be induced. The patient suffers extreme distress and anxiety; there is great sensation of constriction about the chest and throat, spasmodic difficulty in breathing, and an inability to speak; the countenance becomes much congested and livid; the eyes protrude and stream with tears; he stands up, gropes wildly with his hands, and is pacified with great difficulty. As the attack goes off, there are deep, sobbing inspirations, and catches in the breathing. These symptoms, which are analogous to those induced by the irritation of the inside of the larynx through an aerial fistula, may be termed *laryngeal*.

The first class of symptoms is produced by the application of an irritant to the mucous membrane of the pharynx; the second, to irritation of the larynx. Their severity will, in a great measure, depend upon the nature of the irritant applied. They will necessarily be far more severe when a sponge soaked in a caustic solution is thrust down the throat, than when a smooth and unirritating gum-elastic tube is passed.

Both these classes of symptoms are commonly met with after the application of the throat probang. When the *pharyngeal* symptoms occur, there can be little doubt that no sponge saturated with a strong solution of nitrate of silver has penetrated into the glottis. But is not the case different when the *laryngeal* symptoms are fully developed? Must these not, when existing in their full intensity, be taken as evidence of the introduction of the sponge probang through the glottis? To this I have no hesitation in answering in the negative. I have repeatedly brought on these symptoms, in the most morbid degree, without the use of a sponge at all, or the introduction of any solid body into the larynx. In fact, if a drop of a strong solution of the nitrate of silver is fairly *inspired* into the larynx, the most intense distress and appearance of impending asphyxia will be induced. I saw this well exemplified, some time since, at the hospital, whilst applying a strong solution of nitrate of silver, by means of lint wrapped round a probe, to a syphilitic ulcer on the soft palate, altogether away from the larynx; a drop was accidentally inhaled, when the patient was suddenly seized with one of the most intense attacks of laryngeal spasm that I have ever seen; for a few moments she appeared to be about to die, asphyxiated, and had all the laryngeal symptoms above described fully marked.

In many cases I am in the habit of applying the solution of the nitrate of silver by means of a strong glass tube, bent nearly at right angles about an inch from one extremity. A few drops of the solution are introduced into the bent end of the tube, and this being passed over the back of the patient's tongue, so as to overhang the glottis, the other end is closed by the pressure of the finger. The patient having previously emptied his chest, is then told to take a deep breath, and, at the moment of doing this, the finger being removed from the tube, the solution contained at its bent end is inhaled fairly into the larynx; and, when so applied, will produce the symptoms already described.

Thus, then, we may conclude that when the *pharyngeal* symptoms exist alone, the sponge cannot have passed into the true air-passages; and that the *laryngeal* symptoms, however intense they may be, afford no evidence of more than the inhalation of a drop or two of the caustic solution into the glottis.

2. *Sensations of the Surgeon.*—The little reliance that can be placed on the mere sense of touch in many explorations of the mucous canal is well known to surgeons. It often happens, for instance, that, in the attempt to relieve retention of urine from enlarged prostate, the catheter is supposed to be lodged in the bladder, when it has only reached the dilated sinus of the urethra: so also, in passing bougies up the rectum, that the instrument has entered the

sigmoid flexure, when, in reality, it has curled back upon itself. Those practitioners, however, who believe in the possibility of passing the sponge probang beyond the vocal cords, rely much on the sensations communicated by its passage through this narrowed portion of the larynx. They say that in passing the instrument to the proper depth, a certain sense of obstruction is felt; against this, which is believed to be the vocal cords, the sponge is firmly pressed for a moment, when the obstacle yields, and the instrument passes onwards into the air-tubes. On the withdrawal of the probang, the same feeling of constriction is experienced by the sponge being drawn up against the cords. These sensations are undoubtedly experienced. I have many times felt them myself, and, had I judged by them alone, could have been almost certain that I had passed the instrument between and below the vocal cords, and this belief would have been strengthened by the circumstance that in many of the instances in which this constriction was felt the *laryngeal* symptoms were manifested. I soon found, however, that this was by no means uniformly the case, but that it not unfrequently happened that the *pharyngeal* symptoms only were induced, and that consequently, in accordance with what I believed to be the proper state of sensibility of the larynx, the interior of that tube could not have been traversed by the caustic sponge. Finding, also, the same sensation often experienced in the introduction of bougies and tubes into the œsophagus and stomach, it was clear that it could have nothing to do with their progress through the larynx, and I was led to conclude that it was occasioned by the passage of the instrument through that narrowed portion of the end of the pharynx, or the beginning of the œsophagus, where the cartilages of the larynx, projecting backwards, give rise to a certain amount of constriction, compressing the gullet, as it were, against the spine. Here the instrument meets with a certain degree of obstruction, which is partly mechanical and partly occasioned by spasm of the constrictors of the pharynx; and, on this being overcome, passes on with a sudden slip, again to meet with a degree of constriction on being withdrawn.

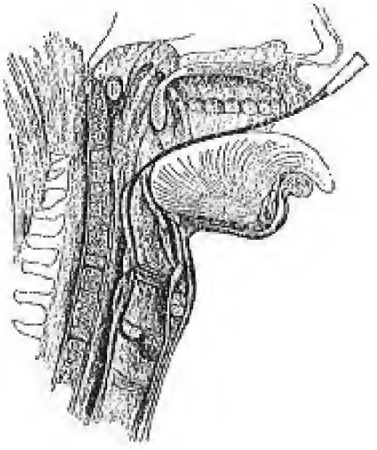
In numerous experiments on the dead body that I have made on this point, I have very frequently found that the instrument had passed into the œsophagus, when, from the sensation it gave, those who had introduced it felt confident that it had entered the air-passages. In fact, the shape of the sponge probang, as it is always sold (see Fig. 1), is such that it cannot be made to enter the larynx and to pass beyond the vocal cords in the dead body, without the employment of a considerable degree of force, and by means of those manipulations which are alone admissible in the living patient. A probang, with a short curve, such as those that are uniformly employed, has a natural tendency to take the direct passage, as it were, down the œsophagus, instead of turning forwards to enter the larynx. When the curve is much increased, as in an ordinary catheter, the sponge may during life be passed between the lips of the glottis, but it cannot even then be made to pass between and below the vocal cords, in consequence of the curve being too large to be admitted into the diameter of the trachea. The evidence of the New York Academy commission fully warrants this statement, for the reporters remark that, notwithstanding the most persevering efforts with the whalebone slightly bent, as used by Dr. Green, and with patients who quietly submitted to the test of experiment, the results were entirely negative. In no instance did it enter the trachea. In two instances, with the whalebone *curved like a common catheter*, the sponge was thought to have entered the larynx, but, with repeated attempts, it could not be forced between the vocal cords, and the suffocation was so great that it was necessary to withdraw the instrument.

If a small curved probang, of the ordinary shape, be made to enter the larynx of a dead subject, by raising the handle well against the upper teeth, and pressing the sponge forcibly forwards between and under the tongue, and then be pushed down between and beyond the vocal cords, it will be found that the sponge scrapes along the anterior wall of the trachea, and that the handle of the instrument is thrown into the extraordinary curves represented in Fig. 2. That inflamed and irritable air-passages would benefit under treatment such as this, seems scarcely probable.

The fallacy of the sensations of the surgeon is well illustrated in the fol-

lowing extract from the report of the commission of the New York Academy: "We witnessed in cases 11 and 21 the fallacy of Dr. Green's opinion as to the success of his experiment, though based on so large an experience. In both instances, whilst positive that he had successfully passed the instrument (an elastic tube) into the trachea, *the patient vomited through the tube*, and thus demonstrated his error."

Fig. 2.



From these observations, then, I would conclude that the sensations of the surgeon afford no reliable evidence as to the course taken by the instrument.

3. In asserting that the sponge probang can be passed into the air-passages, much reliance has been placed on the analogy afforded by the introduction of tubes for the purpose of artificial respiration, and in the occasional inhalation of foreign bodies. Does any such analogy really exist? I think not. It seems to me that so very different a degree of irritation would be set up by the introduction of a smooth, well-oiled tube, of small calibre, through which the patient can breathe, and from which consequently there is no risk of suffocation, and the passage of a caustic sponge, which not only would stimulate the part violently, but would necessarily induce temporary asphyxia by blocking up mechanically the air-passage, that no analogy can be drawn from the one case to the other. To do so seems about as reasonable as to infer that because a gum-elastic or silver catheter may be passed along the urethra, therefore a whalebone rod, tipped with a sponge soaked in a caustic liquid, might also be introduced into the bladder.

With regard to the introduction of foreign bodies into the larynx, it appears to me that there is no analogy whatever between this accident and the passage of the caustic sponge. In the one case the parts are taken by surprise, the foreign body being accidentally sucked into the chest by a rush of air, during inspiration, through an open glottis; in the other case the patient is prepared for what is about to take place, involuntarily and instinctively resists, and, holding his breath, keeps the glottis closed.

But, setting aside this question of analogy, which is of little moment, is the introduction of tubes, even into the larynx, so very easy and simple and certain a procedure as some writers seem to suppose it to be? On the dead body, un-

doubtedly, nothing is easier than to pass a catheter into the larynx, and down into either bronchus; but is it so in the living? That excellent surgeon, Mr. Porter, of Dublin, when speaking of the introduction of Desault's tubes through the rima glottidis, in cases of cut throat, says: "Awkward and reiterated attempts produce inconceivable distress, and, even when performed with the utmost dexterity, it must unavoidably excite cough and restlessness" (p. 225). And again: "Every time the instrument touches the larynx the patient becomes anxious and restless; he tosses himself about, and coughs convulsively; and each motion, whilst it increases his own distress, renders the performance of the operation more difficult. . . . Can such a patient endure the irritation that a few moments' unsuccessful poking at the rima glottidis will inevitably occasion?" (pp. 256–7.) The truth of these remarks must be acquiesced in by every surgeon who has ever attempted the operation there described.

On this point the evidence of the New York Academy commission is peculiarly valuable. That commission, in its inquiry, employed two tubes, the size of a No. 10 catheter; one, selected by Dr. Green, was slightly bent at its extremity, and was one of the kind employed by him in his practice. The other consisted of a catheter with a wire stilette, bent with a curve, the segment of a circle six inches in diameter. This tube does not appear to be used in practice, but was employed for the purpose of comparison. The result of the experiments with these tubes was, that Dr. Green (who was the only one that employed it) failed in passing the tube with the *small* curve in thirty-five out of thirty-eight trials, or in about ninety-two per cent. of the cases; and that the tube with the *large* curve was passed in eight cases out of thirteen; whilst the sponge probang failed in every case (eighteen) in which it was tried.

"From these experiments it would appear that the instrument best adapted to succeed in catheterism of the air-passages is the tube having a large curve; whilst that least adapted to enter the trachea is the sponge probang."

In the course of these experiments, a point of much interest was elicited by the commission, viz: that a patient might blow out a lighted candle, or collapse and inflate a bladder attached to its free extremity, through the tube, even though it had never entered the trachea, but had been purposely passed into the œsophagus.

On this third point, then, I think we are warranted in the conclusion that there is not sufficient analogy between the introduction of the sponge probang and that of a catheter tube into the larynx, to lead us to suppose the passage of the former instrument possible because that of the latter is occasionally practicable; and that the introduction even of a tube of the same shape as the sponge probang is an operation of extreme difficulty, failing in far the greater proportion of cases in which it has been attempted; and that the introduction of foreign bodies into the larynx is effected under totally different conditions to that in which the sponge is attempted to be passed.

Finally, I think that we are fully justified in adopting the conclusion of the commission of the New York Academy, that there is no reliable evidence that the sponge probang has ever been passed through and beyond the vocal cords. —*Lancet*, Nov. 24 and Dec. 1, 1855.

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11. *The Nature and Treatment of Encephalo-Meningitis.*—Dr. Leon Liegard, whose special attention has been drawn to this disease by the excessive fatality of meningitis of children in the Hôpital de l'Enfant Jésus, and by the apparent inefficacy of the various remedies of an opposite character administered, supports M. Robin's opinion, that the granulations met with in these cases are not of a tuberculous character, and that we must therefore materially modify our views with regard to the nature and treatment of the disease. It appears that the medical officers of the hospital had been so discouraged by the inutility of applying either the antiphlogistic, the alterative, or the tonic mode of treatment, that they abandoned therapeutic attempts altogether; and, a diagnosis of meningitis having been established, resigned their patients to their fate. The views advocated by the author are mainly based upon Robin's micrographic account of the granulations, so that it is necessary to give a summary of his description.

Robin assumes two varieties. The first is of a yellowish tint, softish to the